

Diplomarbeit / Masters Project

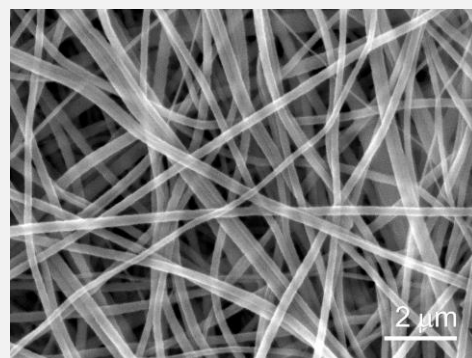
Project Summary:

Cyclodextrin crosslinked composite nanofiber for highly efficient removal of steroid hormones

Organic micropollutants such as steroid occur in water in increasing quantities from predominantly anthropogenic sources. The functionalization of nanofibers with cyclodextrins (CD) is extremely interesting since such nanofibers containing CD molecules can potentially act as an efficient molecular filter by combining the specific complex formation with organic compounds with the very high surface area of the nanofibers. However, membranes from PES-CD are water-soluble. Therefore, the surface of cyclodextrin has been modified to avoid the leaching of cyclodextrin molecules from the nanofiber surface.

The aim of this project is to develop and characterize these membranes i) for water permeability, ii) micropollutant adsorption, iii) breakthrough behaviour. Based on the variation of a number of water quality parameters interaction mechanisms can be understood and the potential micropollutant uptake capacity estimated. The specific tasks will be;

- Literature review on the topic (CD like materials; nanofiber membrane; micropollutants removal; endocrine disrupting chemicals (EDCs); advanced membrane materials)
- Perform PES-CD nanofiber membrane permeability, adsorption and breakthrough experiments
- Perform static adsorption of estradiol at various conditions
- Analyse water samples from experiments with relevant analytical instruments following calibration and validation
- Analyse experimental data and write/co-author a research publication (in English)



The topic builds on previous projects from which some publications are available.

Required Skills:

Studies in Chemical/Process Engineering or equivalent (Uni, TH)

Basic knowledge in water quality, water treatment technologies, membrane technology, nanomaterials. Evidenced writing skills in English language, proficiency with Origin Labs software for data analysis and graphing, willingness to lead or contribute to the writing of a scientific publication.

Institute/ Department:

Institute for Functional Interfaces / Membrane Technology Department (IFG-MT)

Start Date:

Flexible/negotiable (projects are typically scoped for a duration of 6 months)

Application Procedure:

Please email CV, academic transcripts and motivation letter with available time period for evaluation.

Project Advisor(s):

Prof. Dr.-Ing. Andrea Schäfer, Andrea.Iris.Schaefer@kit.edu; <http://mt.ifg.kit.edu/>
Dr Alaa Khalil, alaa.khalil2@kit.edu, Germany, IFG-MT, KIT